to the aard-wolf (p. 15) as a solely South African animal. More serious is the repetition of the error that blue foxes are the summer representatives of white foxes (p. 19), both being, as a matter of fact, in the winter coat. In our notice of the first two parts, we directed attention to a discrepancy between the lettering of some of the coloured plates and their descriptions; the same thing occurs in the plate of the polar bear facing p. 20, the animal being called *Ursus arctos* in the one place and *U. maritimus* in the other. Finally (p. 172), Euelephas is not the generic name for the Indian elephant, while there is no sort of justification for alluding to the polecat (p. 289) as *Putorius ermineus,* and the weasel (p. 290) as *Mustela vulgaris,* both animals belonging to the same genus, whether this be called by the one name or the other.

As samples of the better class of illustrations in this volume, we reproduce the figures of the cocoa-nut crab (Fig. 1) and of the "Gila monster," or Arizona poisonous lizard (Fig. 2). R. L.

NOTES.

THE American Academy of Arts and Sciences has, says *Science,* elected Dr. Joseph Larmor, F.R.S., as foreign honorary member in succession to the late Sir G. G. Stokes

THE eighty-fifth session of the Institution of Civil Engineers was opened on Tuesday, when Sir William White, the new president, delivered an inaugural address of great importance, in which he discussed the main lines of recent advance in ship construction, the present conditions of British shipping and ship-construction, and warship building since 1860.

IT is announced by the *Electrician* that this year it is proposed to award the Nobel physics prize to Signor Marconi, the chemistry prize to Prof. Arrhenius, and the medicine prize to Prof. Finsen. Each prize is worth about 8000*l.*

THE United States National Academy of Sciences will hold its autumn meeting in Chicago, beginning on November 17.

WE regret to learn of the death on September 24 of Mr. J. A. Brown, aged seventy-two. He was an enthusiastic collector of flint implements, and author of a work entitled "Palæolithic Man in N.W. Middlesex" (1887).

A REUTER telegram from Stockholm states that Baron E. Nordenskjold has arranged to make a zoological and anthropological expedition to the frontiers of Peru and Bolivia. The expedition will start at the end of December or the beginning of January.

REFERRING to the suggested existence of radium in the sun, a correspondent points out that not a single line in the ultra-violet spectrum of radium described by Sir William Crookes (*Proceedings* Roy. Soc., vol. lxxii., No. 482) coincides exactly with a solar line. "The strongest radium line in Sir William's list is 3814·661, which is very near the solar line 3814·671 assigned to iron and carbon. but is not coincident with it."

THE *Terra Nova* and the *Morning,* the vessels which are to go to the relief of the Antarctic expedition on board the *Discovery,* have arrived at Hobart. The two vessels will leave together in the first week of December. The Swedish ship *Frithiof,* which is going to the relief of Dr. Nordenskjold's Antarctic Expedition, arrived at Buenos Ayres on October 30.

AT the end of last session it was decided to hold the meetings of the Physical Society alternately in the afternoons and evenings, and to change the place of meeting from the Chemical Society to the Royal College of Science, where the facilities for experimental demonstration are very complete. The first evening meeting will be held on Friday, November 13, at 8 p.m., when Sir Oliver Lodge will describe and illustrate by experiments (1) means for electrifying the atmosphere on a large scale, and (2) an arrangement for driving mercury pumps.

THE Paris correspondent of the *Times* states that the Sanitary Conference has at present under its consideration a project for the creation of an international sanitary bureau for the collection of information respecting infectious diseases, such as plague, cholera, and yellow fever, and also for the harmonious working of those sanitary regulations in the East which have so greatly contributed within the last five years to the preservation of public health as well as to the benefit of trade by the suppression of the old quarantine system. The international sanitary bureau would have its headquarters in Paris.

CAPTAIN J. M. JAMES, of Tokio, sends the following table showing the dates on which the first fall of snow took place on the summit of Fuji-Yama, the height of which in 1884 was 12,425 feet ±25 feet:—1884, October 6, light; 1885, September 27, light; 1886, October 7, light; 1887, October 2, heavy fall; 1888, October 1, heavy fall; 1889, September 25, heavy fall; 1890, October 4, light; 1891, October 12, heavy fall; 1892, September 25, light; 1893, October 7, heavy fall; 1894, September 22, light; 1895, October 3, light; 1896, September 21, light; 1897, October 5, light; 1898, September 26, heavy fall; 1899, September 16, heavy fall; 1900, September 25, heavy fall; 1901, September 25, heavy fall; 1902, September 19, heavy fall; 1903, September 27, heavy fall.

AT the recent meeting of the German Association at Cassel, Prof. Penck, of Vienna, was to have given an address on geological time, but illness prevented him from doing so, and his place was taken at the last moment by Prof. Conwentz, of Berlin. The writer of the article upon the meeting, in NATURE of October 15 (p. 586), was unaware that any change had been made, and the titles he gave of addresses for delivery on September 22 were those announced in the programme. Prof. Conwentz has now sent us a report of his address, which dealt with the preservation of remarkable natural objects, especially of rare living plants and animals. He pointed to the destruction of orchids in Thüringen, the extermination of rare thistles on the German coasts, the cleansing of brooks from aquatic vegetation, and the destruction of large trees, and argued that, both for scientific and æsthetic reasons, districts should be set aside where the natural features of the country should be preserved, while care should be taken not to destroy needlessly objects of interest to natural history.

IN a letter to NATURE of August 6, Messrs. Hutchins, of Cape Town, referred to the "Research on the Eucalypts Especially in Regard to their Essential Oils" by Messrs. R. T. Baker and H. G. Smith, reviewed in NATURE for April 2 (vol. lxvii. p. 524). The authors of this memoir have sent us a long letter of reply, in the course of which they say that the remarks upon their work are likely to lead to the idea that it has been confined to the chemistry of Eucalyptus oils almost entirely, and that new species have been named and a new classification for the Eucalypts formulated without sufficient warrant. They proceed to point out that their results are not those of the chemist alone, but the joint efforts of a botanist and a chemist, and are supported by the field knowledge of botany of the botanical collector to the Sydney Technological Museum, and by numerous Australian authorities on the Eucalypts.

The lecture on the "New Star in Gemini," delivered by Prof. H. H. Turner at the Royal Institution on June 5, has just been issued as an excerpt from the *Proceedings* of the Institution. Prof. Turner does not confine himself to his discovery of Nova Geminorum, but deals with the nature of new stars generally. He regards dark patches on the celestial sphere as not being actual voids in the stellar universe, but dark nebulæ which hide the light from stars beyond. A new star is due to the collision of a star with such a mass of invisible matter as this; for, adds Prof. Turner, "The friction of the encounter raises the temperature of the star enormously within a day or two, just as a meteor, on entering our tenuous upper atmosphere, is set ablaze in a second or two." This idea is, of course, fundamentally the same as that put forward several years ago in the meteoritic hypothesis as to the origin of new stars; and it is interesting to notice how the stone which the builders of astronomical theory rejected at that time has become the head of the corner since the phenomena of Nova Persei demonstrated the existence of masses of non-luminous matter in celestial spaces. But why did not Prof. Turner remember that Nova Persei only confirmed an explanation of the causes of the phenomena of new stars put forward long ago? He expresses anxiety lest England should fall behind in the progress of scientific discovery "for want of men and money, but especially men," and while we share his uneasiness of mind, his address gives rise to a wonder whether he knows what men have done, and are doing, for the advance of astronomy in this country.

The Prussian Meteorological Institute (Berlin) has recently issued its report for the year 1902. This organisation deals especially with climatology, rainfall, and unusual atmospheric occurrences, while the Deutsche Seewarte (Hamburg) is chiefly occupied with marine meteorology and weather telegraphy. With the Berlin Institute is associated the meteorological and magnetical observatory at Potsdam, and the aëronautical observatory at Tegel. The latter establishment is carrying on a very valuable work in the investigation of the meteorological conditions of the upper air by means of kites and registering balloons, and has, since August, 1902, made daily ascents, the results of which are communicated by telephone to the Berlin office. On one occasion, in December last, a kite attained the unusual height of 5500 metres. These ascents are, in addition to the experiments with manned and unmanned balloons, undertaken in connection with the international monthly balloon ascents, to which we have had frequent occasion to refer. The magnitude of the useful work performed may be gauged from the fact that, including the observations from ordinary meteorological stations, rainfall statistics are received from 2574 places, and that no less than 37,273 reports were received from 1412 stations dealing especially with thunderstorms and unusual occurrences. The latter observations are published yearly in addition to the regular publications of the Institute, together with charts showing the place of origin, the tracks, and the velocity of the storms.

In the *Annalen der Physik*, 10, Messrs. L. Holborn and F. Kurlbaum describe an optical pyrometer, first constructed in 1901, in which the temperature of an incandescent body is determined by photometric observations of the emitted radiations.

The permanence of resistance standards of sheet manganese is discussed in the *Zeitschrift für Instrumentenkunde* by Mr. St. Lindeck, of Charlottenburg. Thirty-one resistances were experimented with from October, 1901, onwards; twenty-six of these were found to vary by not more than 0·05 per cent., and of the ten in which the variations exceeded 0·02 per cent., seven were large models which were subjected to currents of considerable intensity.

A new method of producing tension in liquids is described by Mr. J. T. Jackson in the *Scientific Proceedings* of the Royal Dublin Society (x., part i., 8). The method consists in the application to the particular question considered of the well-known principles governing the flow of liquid in a pipe of variable section. At a constriction the velocity increases and the pressure diminishes, and the author finds that under certain conditions the pressure can be made negative, thus confirming the well-known result according to which liquids may sustain a considerable tension without rupture.

During the past year several fragments of richly carved crosses have been found built into Lancaster Parish Church, which range from the earliest type of fine old Anglian work to late sculpture of the Danish period in the tenth and eleventh centuries. These most interesting relics have been described and figured by Mr. W. G. Collingwood in the current number of the *Reliquary and Illustrated Archaeologist.*

In January, 1901, Mr. F. J. Horniman, M.P., gave his new museum and library, and the adjoining estate and the houses thereon, to the London County Council as places of public recreation and instruction; practically the only condition was that they were to be maintained in a proper state and dedicated to the public for ever. The London County Council has just issued its first annual report, which comprises a period of eighteen months. The report, which is illustrated, briefly states the history of the museum and of its transference, and gives a synopsis of the contents of the museum and of the scope of the library. The former arrangement of the museum has for the present been adhered to, and numerous descriptive labels have been prepared with the view of increasing the educational value of the museum. In the autumn term Dr. A. C. Haddon, F.R.S., the advisory curator, gave a course of lectures to teachers on the natural history of animals, which was illustrated by specimens in the museum and by lantern slides; owing to the large attendance it was necessary to give the lectures in a gallery; the average attendance at the lectures was 114. The total attendance at the museum for 1902 was 238,589, being an average of 658 on the opening days. The museum was visited by ninety-seven schools and institutions, with an average attendance of nineteen children. From these figures it will be seen that the educational advantages of the museum are appreciated, and there is every reason to believe that the next annual report will show that these are being increased. It may be added that the Horniman Museum and Library (at Forest Hill, S.E.) are open free to the public from 2 p.m. to 9 p.m. every day in the year except Christmas Day.

From the report of the Natural History Society of Northumberland, &c., we are glad to learn that the threatened split between that body and the Tyneside Naturalists' Field Club, to which allusion was recently made in our columns, has been avoided, and that for the future the two institutions are to amalgamate their forces.

It is distinctly refreshing to find an American naturalist protesting against slavish adherence to the "fetish of priority," as it is called by Dr. Gadow, in nomenclature, especially when there may be a doubt as to whether the names are really synonymous. In No. 76 (vol. xi.) of the zoological series of *Publications* of the Field Columbian Museum, Dr. D. G. Elliot directs attention to the use of the term Odocoileus for the American white-tailed deer and its relatives. That term was proposed by Rafinesque in 1832 for a fossil premolar of some kind of deer, which has been assumed to belong to the whitetail or some closely allied species. Even if this be really the case, Dr. Elliot doubts "whether a genus founded upon some fossil remains of an otherwise entirely unknown animal of a past age should be unhesitatingly adopted for a group of existing species that may be, in the majority of its characters, widely different from the extinct form." He further suggests the inadvisability of adopting palæontological names in any case for living forms, but adds that if such are used, the name Anoglochis, applied to European Tertiary deer, seems, as pointed out by Mr. Lydekker, to be available for the whitetail. It may be pointed out that, instead of giving a new name to the fossil deer-tooth, Rafinesque ought to have called it Cervus, and that by adopting Odocoileus we perpetuate an instance of ignorance and incapacity on the part of its proposer.

REFERENCE may be made to another change of nomenclature which, if adopted, is likely to cause the extreme of inconvenience with no resulting advantage. Almost from time immemorial the marmosets have been known as Hapale and the titi monkeys as Callithrix. In the October issue of the *Annals*, a well-known zoologist proposes to transfer the latter term to the marmosets (for which it appears to have been first employed) and to give a new name to the marmosets. In such instances, we venture to think, a "statute of limitations" should be insisted on. The replacement of well-established names is bad enough, but their transposition is unspeakable.

Two parts of vol. x. of the *Decennial Publications* of the University of Chicago are to hand. In the one Mr. A. C. Eycleshymer treats of the early stages of the development of the bony pike (*Lepidosteus osseus*), as observed in living specimens and preserved material. After treating this exhaustively, the author compares the phases with those of the few other living representatives of the enamel-scaled fishes, concluding with general remarks on the character and significance of yolk-cleavage. The view that similarity in the first four stages of cleavage indicates kinship between the bony pike and teleost fishes is not accepted. The second of the two is devoted to the results of a study of the development of colour and colour-pattern in beetles and in insects generally, by Mr. W. L. Tower. It appears that insects show two distinct types of coloration, the one —dermal (or cuticula) and hypodermal—as ancient as the group itself, and consisting of colours arranged in segmentally disposed spots and stripes, correlated with the deeper vital organs; the other, of much later origin, produced by scales, or modified hairs. This secondary type tends to suppress and obscure the original one, and, being developed independently of the vital structures, permits of much greater variation and diversity; it is, in fact, a purely ornamental type. The essential difference between the two may be realised by contrasting the sombre browns and yellows of the ground-beetles of the genus Carabus with the brilliant pattern of butterflies of the Vanessa group. Cuticula colouring (as shown in the beautifully coloured plate of beetles) commences in the fore part of the body, where the muscles first harden, and gradually spreads backwards. It is clearly connected with the hardening of the cuticula, which tends to become brown, hence the prevalence of browns and yellows in so many beetles and cockroaches, metallic tints in the former being due, of course, to another cause.

DR. WACE CARLIER and Mr. Lovatt Evans have made some interesting observations upon the so-called hibernating gland of the hedgehog (*Journ. Anat. and Physiol.*, xviii., part i.). This is of an orange colour when fully developed, but becomes deeper in tint as the winter sleep progresses, until, towards its end, it is almost black. It at first averages 1–2 per cent. of the body weight, rises by the second month to 2·7 per cent., and then gradually falls 1 per cent. towards the close of hibernation. Careful analyses show that, to commence with, the gland contains 40 per cent. of fat, and that this is reduced to 18 per cent. at the end of hibernation, the proteids during the same period showing a reduction of only 1 per cent. At the beginning of hibernation (October) the animals are exceedingly fat, but by the end of March all the fat stored in the tissues has disappeared. For the first month the weight of the hibernating gland falls rapidly, much fat being removed, but from then until the end of March there is little change, when again the gland loses weight owing to removal of its contained fat, and by the end of May it is completely exhausted and reduced to a mere fibrous cord. It would seem that life during hibernation is maintained practically upon fat alone, and that the hibernating gland is a store of fat reserved for this purpose.

WE have received No. 9, vol. i., of the *Scientific Roll* conducted by Mr. Alexander Ramsay. It deals with the bacteria, which are arranged according to their size, no other information being given than the name of the organism and its "size" position. We have already expressed the opinion that this list is an example of misplaced energy, because there is no such thing as a fixed size for a bacterium, the size varying considerably with alterations in the nutrient soil and other conditions.

THE problem of tracing out the connection of flowering plants with lower types must always possess attraction for botanists. In a number of the *Decennial Publications* of Chicago, Prof. Coulter has expressed the general views held by botanists that a similar line of development is probably not to be expected for monocotyledons and dicotyledons, and that neither of these groups are directly connected with the gymnosperms. The positive suggestion is made that the origin of flowering plants is to be traced to that group of ferns which is represented at the present day by Marattia and Angiopteris.

A GRAPHIC account of some of the curiosities of flora and fauna of the Auckland Isles and Campbell Island is given by Mr. L. Cockayne in the *Lyttelton Times*, wherein he relates the general impressions obtained during a short cruise in southern waters. Contrasts between the flora of these islands and that of New Zealand were observed in the brighter, generally purple or bluish tinge of colour, as compared with white or yellow tones which predominate in similar flowers found in New Zealand; this brightness is not associated with insect visitors, for they are wanting. Again, in New Zealand herbaceous plants rarely die down in winter, whereas in the southern islands many do so, but not owing to the cold, for the forests keep their summer aspect. On Adam's Island Mr. Cockayne had an opportunity of studying the nests of the albatross placed in exposed situations, where the solitary chicken remains on the nest for a year, and on the desolate Bounty Islands were found the nests of the mollyhawk, and numbers of animals, crustaceans, spiders and beetles which make their home in the guano or on the bare rocks.

DR. C. H. LEES wishes to make the following corrections in his account of the British Association discussion on the nature of the emanations from radio-active substances which appeared in NATURE of October 22. In the last line but two of the third paragraph on p. 611, "not yet found to be non-radio-active" should read "not yet found to be radio-active," and in the fifth line from the bottom of the column, "high velocities of the emanations" should read "high velocities of the radiations."

A SECOND edition, revised to June 30, 1903, of the "Student's Handbook of the University and Colleges of Cambridge" has been published by the Cambridge University Press. In addition to a few minor alterations the following important additions have been made to the book, viz. a complete list of university professors, readers, and lecturers, a list of lectures on honours subjects given in the university, and a statement of the set subjects for special examinations. The new regulations for the mathematical papers in the previous examination are also given.

THE first volume of administrative reports and the official reports of the meetings of the International Council for the Study of the Sea deals with the work of the year ending July, 1903, and has now been published by MM. A. F. Høst et Fils, of Copenhagen. The character of the work of this international council was described in our issue for September 3. The volume now published contains the main results of the work arranged by the council for the year dealt with, printed in both English and German.

THE second part of the "Botany of the Færöes," which is based upon Danish investigations, has now been published in Copenhagen by Det nordiske Forlag (London: John Wheldon and Co.). It was expected that this part, together with that published in 1901, would complete the work, but it has been found that a third volume will be necessary. Part iii. will contain papers on the vegetation of land and sea, and will, Prof. Eug. Warming says in a prefatory note, most likely be ready in a year or two.

AT the beginning of next year the firm of Gebrüder Borntraeger, Berlin, will commence the publication of a comprehensive review of progress in physical chemistry under the title "*The Physico-Chemical Review*: a complete international review of the sciences of physical chemistry and the allied branches of chemistry and physics." The magazine will be edited by Dr. Max Rudolphi, Darmstadt, with the cooperation of distinguished chemists and physicists in many parts of the world. The new journal is not intended to be a medium for the publication of original work, but a review of such work described in abstracts furnished, so far as possible, by the authors of papers. It is proposed to include English and French as well as German abstracts. The whole domain of general and physical chemistry, as well as the allied sciences on both sides, so far as they bear on physical chemistry, will come under review. Such an international review will prove of importance and value to practical men as well as to those engaged in the pursuit of purely scientific research. The review will be issued twice a month. Specimen numbers will be sent post free upon application to the publishers, Gebrüder Borntraeger, Berlin SW 11, Dessauer Strasse 29.

THE volume of *Transactions and Proceedings* of the New Zealand Institute for 1902 has been received. This is the thirty-fifth volume published by the board of governors of the Institute, and it is edited by the director, Sir James Hector, F.R.S. Copies can be obtained in this country from Messrs. Kegan Paul, Trench, Trübner and Co. It is impossible to refer to the contents of the sixty papers forming the *Transactions* part of this bulky volume. These original articles are divided into five sections, viz. papers dealing with zoology, botany, geology, chemistry and physics, and miscellaneous subjects. The thirty-fourth annual report of the New Zealand Institute precedes the next main division of the volume, which includes the proceedings of the various incorporated societies, viz. the Wellington Philosophical Society, the Auckland Institute, the Philosophical Institute of Canterbury, the Otago Institute, the Hawke's Bay Philosophical Institute, the Southland Institute, and the Nelson Institute. An appendix contains a tabulated report of the earthquakes in New Zealand during 1902, and seismograph records from different observatories throughout the country for the same year. The volume concludes with fifty-four well executed plates illustrating various papers included in earlier pages.

THE vacation number of the *Berichte* contains two papers on fluorescence. In the first of these Richard Meyer criticises Dr. Hewitt's theory that fluorescence is dependent on oscillatory isomeric change, and urges that a "fluorophore" group must also be present in the molecule. The paper by H. von Tappeiner on the action of fluorescing substances on ferments and toxins is a continuation of a research in which it was shown that fluorescent substances, which have little action on micro-organisms in the dark, become very poisonous in sunlight; thus a culture of Paramecium exposed to sunlight was destroyed in six to ten minutes by a trace of acridine hydrochloride which produced no effect in 100 hours in the dark; of the fluorescent substances examined only æsculin was without action both in the dark and in sunlight. The hydrolysis of starch by diastase is not affected by exposure to sunlight or by the addition of eosin, but if the solution to which the eosin has been added be exposed to sunlight, the yield of maltose is reduced from 76 to 21 per cent.; this retardation, which is only produced by a limited number of fluorescent substances, can be detected when the proportion of eosin is only one part in 400,000, but disappears entirely if the incident light is filtered through a layer of the fluorescent substance. The action of invertin on cane-sugar is also checked by the addition of eosin when the solution is exposed to sunlight, and the effect of one part of eosin in a million can be easily detected. Papayotin appears to be even more sensitive than diastase or invertin. The only toxin investigated was ricin; unlike the enzymes, this was destroyed by all the fluorescent substances examined with the exception of æsculin, but was not injured by non-fluorescent dye-stuffs or by fluorescent substances if kept in the dark.

A PAPER by Knoevenagel on the nature of the double-bond appears in the vacation number of the *Berichte*. In order to account for the conversion of butadiene, $CH_2:CH.CH:CH_2$, into dibromobutylene,

$$CH_2Br.CH:CH.CH_2Br,$$

he suggests that in compounds of this kind the carbon atoms are in a state of oscillatory motion, so that the molecule has, alternately with the formula given above, the structure represented by the formula

$$—CH_2.CH:CH.CH_2—.$$

Applying this theory to the benzene molecule, it is no longer necessary to assume a pendulum-like motion, as the carbon atoms may be regarded as revolving continuously, alternate atoms rotating to the left and to the right; the result of this motion is that the three double bonds travel round the ring, whilst a labile form of the molecule with six free valencies is also indicated. In this way many of the peculiar properties of aromatic compounds may be accounted for.

The additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*) from West Africa, presented by Mr. C. J. Spencer; a Levaillant's Cynictis (*Cynictis penicillata*) from South Africa, presented by Miss Bald; a Blue and Yellow Macaw (*Ara chloroptera*), a Red and Yellow Macaw (*Ara ararauna*) from South America, presented by General Sir Frederick Forestier Walker, K.C.B., G.C.M.G.; two Wharton's Fruit Pigeons (*Carpophaga whartoni*), a Christmas Island Dove (*Chalcophaps natalis*), five Christmas Island Crabs (*Birgus latro*) from Christmas Island, presented by Captain A. W. Cole; a Chameleon (*Chamaeleon vulgaris*) from North Africa, presented by Mrs. T. Wallis; seven Spiny-tailed Mastigures (*Uromastix acanthinurus*) from North Africa, three Brazilian Amphisbœnas (*Amphisboena brasiliana*) from Brazil, an Indian Eryx (*Eryx johni*) from India, two Sharp-nosed Snakes (*Lioheterodon madagascariensis*) from Madagascar, deposited; six Black Swans (*Cygnus atratus*) bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

The Formation of the Polar Caps on Mars.—An interesting paper, by Mr. Percival Lowell, which deals with the manner of formation of the Martian polar caps is published in No. 2 of the Lowell Observatory *Bulletins*. Mr. Lowell observed the old polar cap on July 3, and found it to be diminishing; on July 5 it was only $29''$ of arc in diameter, equal to a diameter of $4^{\circ}.1$ on the planet's surface; and shortly afterwards he noticed that a new, large, white deposit had formed, north of Arethusa Lacus and touching the Pierius-Callirrhoe, in longitude 340°. This new white patch extended from the old polar cap to about latitude 55° N., and the Pierius, which it crossed, could be seen running through it, thereby showing that the appearance was due to a deposit and not to clouds, which would have obliterated all the features equally; it also indicates that some kind of vegetation, which had caused the deposit partially to melt, exists in the neighbourhood of the Pierius.

From July 7 to 17 the dark line of demarcation which usually surrounds the cap became less marked, until it was finally obliterated by the encroaching deposit of frost, only a superior whiteness, caused by the newly deposited frost lacking the sheen of the older, weathered and ice-welded snow, marking the presence of the older cap. It is only reasonable to suppose that this deposit actually was frost as we know it, for it is evident that a layer of frozen gas, such as solid carbon dioxide, would pass directly from the solid to the gaseous form under the pressure conditions obtaining on Mars, and would not exhibit the phenomenon of slowly melting such as was observed in the region about the Pierius.

The quick melting of the outer and the durability of the inner portion of the Martian snow-cap are both explained by these observations, which show that the whole cap consists of a perpetual kernel which periodically becomes surrounded by a shallow transitory husk, the formation of which was observed by Mr. Lowell.

The same observer also performed some experiments in connection with the visibility of the Martian canals, which showed that a wire having an angular width of $0''.69$ at 1800 yards could be readily "glimpsed" with the naked eye, and from this he deduces that any canal having a width of half a mile on the planet's surface should be readily observable with a good telescope.

Wolf's Variable Star 59, 1903, Cygni.—A communication from Prof. Pickering to the *Astronomische Nachrichten* (No. 3911) states that the star recently announced by Wolf as being a probable nova appears on a large number of plates taken at Harvard between October 29, 1891, and the present time. On a plate exposed on July 30, 1895, the spectrum of this star is of the fourth type, and, from the series of plates, it is seen that the brightness varies by more than two magnitudes.

In the same periodical Prof. Wirtz records an observation made by him at Strassburg on October 15, when he found that the approximate magnitude of this object was 10·5, and that a comparison of its focus with that of several known stars on the Strassburg refractor showed no difference. The identity of this variable with the star B.D. $+37^{\circ}.3876$ is confirmed by Prof. Wirtz.

Periodical Changes in the Colours of Jupiter's Belts.—In No. 3908 of the *Astronomische Nachrichten*, Mr. Stanley Williams directs attention to the periodical colour changes of Jupiter's equatorial belts announced in vol. lix. (p. 378) of the *Monthly Notices*.

The computed times of the maximum and minimum brightness of the respective belts are very uncertain, and Mr. Williams suggests that careful observations should be immediately commenced with the object of exactly determining the date when the red colour has entirely disappeared from the southern belt, and also the date of its corresponding reappearance, which will probably take place some time next year.

Mr. Williams's own observations indicate that the red colour has already almost entirely disappeared from this belt, some parts actually appearing blue, except in the neighbourhood immediately following the Great Red Spot, between longitudes 60 and 180, whilst the northern belt is of a bright, deep red colour.

The Multiple Tail of Comet 1903 *c*.—In discussing a number of beautiful photographs of Borelly's comet, which were obtained at Yerkes with a lantern lens having an aperture of 1·6 inches and a focal length of 6·3 inches, and are reproduced in the current number of the *Astrophysical Journal*, Prof. Barnard advances a novel explanation of the great changes of form which were observed in the tails of this and other comets.

From two photographs taken at Yerkes on July 24, the one immediately after the other, and one taken by M. Quénisset at Nanterre on the same date, it is seen that an enormous change in the form of the tail took place at about 2h. 30m. (G.M.T.), when a section of it broke away from the head and travelled in a retrograde direction at a rate, referred to the motion of the head, of about 29 miles per second. As the velocity of the comet itself was, at this period, about 22 miles per second *towards* the sun, it will be seen that the actual velocity of the section showed a repulsion of 7 miles per second *from* that body.

As an explanation of this phenomenon, Prof. Barnard suggests that either the outburst from the coma suddenly took place in a slightly different direction, or else the existing tail was forcibly detached by some unknown body (*e.g.* a swarm of meteorites), and simply floated away in its old path, under the sun's repulsion, until it was dissipated, or its light-emitting power died away; meanwhile, the new tail was formed by the material evolved by the coma, and for some reason the particles were evolved with a greater velocity than before, so that we get the phenomenon of the two tails nearly parallel for some distance, as shown on the Yerkes and other photographs.

THE SWISS ASSOCIATION OF NATURAL SCIENCES.

The eighty-sixth meeting of the Société helvétique des Sciences naturelles was held at Locarno on September 2–5. Both as regards the number of visitors and the number and variety of the papers read, the gathering was highly successful. Several of the communications presented at the general meetings of the Association were especially well received.

M. A. Pioda (Locarno), the president for the year, after referring to the naturalists of the nineteenth century in his presidential address, went on to show that, in the same way as all other sciences have gradually been differentiated from